

AMENDMENT

Please enter the following amendments:

IN THE CLAIMS

Cancel claims 1-9 and 15 without prejudice or disclaimer toward pursuit of these claims in a divisional application.

Please amend claims 10 and 11 as follows:

10. (Amended) A method of conducting a catalytic chemical reaction in a reactor, with at least one gas phase reactant, said method having the steps of flowing said at least one gas phase reactant past a catalyst material and reacting said at least one gas phase reactant to form at least one product; wherein the improvement comprises:

201 (a) providing said catalyst material as a porous structure having a porosity that permits molecular diffusion therein, said porous structure further having a length, a width and a thickness, said porous structure defining at least a portion of at least one wall of a microchannel defining a bulk flow path through which said at least one reactant passes;

(b) flowing said at least one gas phase reactant through said microchannel, past and in contact with said porous structure containing said catalyst material, a portion of said at least one gas phase reactant molecularly diffusing transversely into said porous structure and reacting

therein wherefrom said at least one product molecularly diffuses transversely into said bulk flow path, and transporting said at least one product from a reactor.

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21.
11. (Amended) The method as recited in claim 10, wherein said catalytic reaction is selected from the group consisting of steam reforming, CO₂ reforming, partial oxidation, chlorination, fluorination, hydrogenation, dehydrogenation, nitration, water gas shift, reverse water gas shift, autothermal reforming, combustion, hydrocracking and hydrosulfurization.

Please add claims 16-28 as follows:

6.
16. The method of claim 10 wherein the porous structure has geometrically regular porosity.

7.
17. The method of claim 16 wherein the geometrically regular porosity is formed by a honeycomb or parallel pore structure.

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8.
18. The method of claim 10 wherein the porous structure is in the form of a felt.

9.
19. The method of claim 10 wherein the porous structure has a pore size of from about 0.1 μm to about 200 μm .

10.
20. The method of claim 10 wherein the step of providing said catalyst material as a porous structure comprises placing a removable insert adjacent a wall of a nonporous material.

¹¹
~~21.~~ The method of claim ¹~~10~~ wherein pressure drop across the reactor ranges from about 0.1 psi to about 5 psi.

¹²
~~22.~~ The method of claim ³~~12~~ wherein pressure drop across the reactor ranges from about 0.1 psi to about 5 psi.

¹³
~~23.~~ A method of conducting a catalytic chemical reaction with at least one gas phase reactant, comprising:

132 (a) providing a catalyst material as a porous structure having a porosity that permits molecular diffusion therein, said porous structure further having a length, a width and a thickness, said porous structure defining at least a portion of at least one wall of a microchannel defining a bulk flow path through which said at least one reactant passes;

(b) flowing said at least one gas phase reactant through said microchannel, past and in contact with said porous structure containing said catalyst material, a portion of said at least one gas phase reactant molecularly diffusing transversely into said porous structure and reacting therein to form at least one product, wherefrom said at least one product molecularly diffuses transversely into a secondary fluid, and collecting said at least one product.

¹⁴
~~24.~~ The method as recited in claim ¹³~~23~~, wherein said catalytic reaction is selected from the group consisting of steam reforming, CO₂ reforming, partial oxidation, chlorination,